Team Innovation and Perceptions of Consideration: What Difference Does Diversity Make?

Steven H. Cady and Joanie Valentine

Small Group Research 1999; 30; 730
DOI: 10.1177/104649649903000604

TEAM INNOVATION AND PERCEPTIONS OF CONSIDERATION
What Difference Does Diversity Make?

STEVEN H. CADY
JOANIE VALENTINE
Bowling Green State University

This article presents an authentic field study, which used an entropy-based formula to measure team diversity, of 50 teams. The data were collected in a division of a high-tech, Fortune 500 company. The results revealed that diversity (race, age, sex, and function) had no impact on quality of innovation, whereas sex and race had a negative and positive impact, respectively, on quantity of innovation. It was also found that race and sex negatively influenced perceptions of teaming consideration.

The level of diversity and interdependent work processes is increasing at such a pace that the capability to innovate will be a major challenge for organizations of the future. Theorists are particularly interested in innovation because it is central to organizational adaptation and renewal (Nohria & Gulati, 1996). In *Workforce 2020*, Judy and D'Amico (1997) predict that product life cycles will shorten, strengthening the need for constant innovation. Their study also describes a trend toward pluralism along several diversity dimensions. For example, in 1997, women accounted for 46% of the work force, up from 29% in 1950. In addition, as we progress into the next millennium, 80% of new entrants will not be White males.

AUTHORS' NOTE: *An earlier version of this article was accepted for presentation at the 1999 Academy of Management Meetings. We wish to thank the following people for taking the time to review and provide constructive guidance on previous versions of this article: Arthur Darrow, Susan E. Jackson, Mitchell J. Neubert, and Harry C. Triandis.*

SMALL GROUP RESEARCH, Vol. 30 No. 6, December 1999 730-750

Diversity is particularly relevant in the context of teams. Most of the traditional theories of organizations are based on old bureaucratic homogeneous organizations, yet current trends reveal flatter, leaner, and more diverse team-based organizations (Cox, 1994; Jackson & Ruderman, 1996; Rodriguez, 1998). Understanding the dynamics of diversity within work teams striving to develop innovative solutions can provide insight into how to gain the most value from these inevitabilities.

We therefore present research that combines an analysis of four demographic diversity dimensions (age, race, sex, and function) in a single field experiment with 50 authentic, problem-solving teams. Our question is, what impact do these diversity dimensions have on innovation and perceptions of consideration? This interesting and largely unexplored question is examined in this study.

CONCEPTUAL ANALYSIS AND HYPOTHESES

Very little work has been done to examine solution quality and group predictors of innovativeness since the early work of Maier (1970), who looked at the role of leaders in group problem solving. In our conceptual analysis, we will begin with the end in mind as we explain the model tested in this study.

OUTCOMES OF TEAM DIVERSITY

Quantity of Innovation

The quantity of innovation is simply defined as the number of new ideas generated—ideas that have not been previously conceived. For example, Dougherty and Hardy (1996) address the importance of sustained innovation in organizations. Sustaining innovation relates to the organization's capability to generate new product and service ideas. The greater the number of new ideas, the more likely the organization is to develop one into a profitable venture. Whereas the quantity of innovation is important, there is a

second perspective that tends to be examined as well—quality of innovation.

Quality of Innovation

The quality of innovation has to do with the idea's usefulness. That is, what kind of business impact does the idea have on the organization? Authors have referred to innovation in terms of *adoption*. Adoption incorporates the generation, development, and implementation of new ideas or behaviors (Damanpour, 1991). We therefore define quality of innovation as the degree to which an idea that fills a need or solves a problem can be successfully adopted by an organization. Research on the quality of innovation in teams tends to use an averaging approach (McLeod, Lobel, & Cox, 1996). That is, each idea a team develops is evaluated to compute an overall score for the quality of innovation (e.g., Rogelberg & Rumery, 1996).

Perception of Teaming Consideration

For diversity in teams to be leveraged, the members' perspectives should be equally expressed and integrated. Although we could find no direct research on the perception of consideration in teams, we did find related work (e.g., McLeod et al., 1996; Rogelberg & Rumery, 1996; Siegel & Kaemmerer, 1978). For example, McLeod et al. (1996) found that the more homogenous groups reported a more favorable group process than the heterogeneous groups. We therefore propose that perception of team consideration refers to the team member's felt level of consideration, innovation, and input that characterizes the teaming process.

THE IMPACT OF DIVERSITY

Because little research has examined the impact of diversity on innovation in teams, we draw from social categorization theory to determine the dimensions of diversity to examine in this study. These dimensions are the more easily detectable attributes of age,

sex, race, and functional background. Concurring with Williams and O'Reilly (1998), we feel that the four diversity dimensions in this study have been well examined in the literature and are relevant to managers.

Of the demography research examining age, sex, race, and function, we seem to have found the "double-edged sword" that Milliken and Martins (1996) described in their review of the literature and the theoretical model later proposed by Williams and O'Reilly (1998). On one side, information and decision-making theories predict that diversity leads to increased cognitive processing, careful analysis, and better use of information. The result is enhanced creativity and problem solving. For example, studies reveal that the insights and sensitivities brought by people of varying backgrounds increases flexibility and promotes high-quality innovations (Cox, 1994; McLeod et al., 1996; Rogelberg & Rumery, 1996; Watson, Kumar, & Michaelson, 1993). It is interesting that these positive results appear to be independent of how well the group process works (Tziner & Eden, 1985).

On the other side, similarity/attraction theories predict that diversity decreases liking, effective communication, and cohesiveness in teams; social categorization theory predicts that diversity increases conflict, communication problems, and factionalism. The result is lower levels of the following: attraction to the group, commitment, ability to meet team members' needs, and social integration (Williams & O'Reilly, 1998). Likewise, research indicates that diversity leads to negative evaluations of the teaming process, lower levels of psychological attachment, and decreased group attractiveness (e.g., Baugh & Graen, 1997; Greenhaus, Parasuraman, & Wormley, 1990; Jackson et al., 1991; McLeod et al., 1996; Tsui, Egan, & O'Reilly, 1992; Tsui, Egan, & Xin, 1995; Zenger & Lawrence, 1989). We will present specific support for the diversity dimensions examined in this study.

Race

Because of the limited amount of research, we sought and integrated studies that looked at racial, racioethnic, and ethnic diversity

dimensions. Overall, the research suggests a positive effect of racial diversity on innovation. In one study, Milliken and Martins (1996) found that racial diversity may be positively associated with some group-level cognitive outcomes such as the quality of ideas generated. Two other studies were found that offered evidence of diversity benefits in terms of quality of solutions presented or ideas generated by ethnically diverse groups (McLeod et al., 1996; Watson et al., 1993). For example, McLeod et al. found that ethnically heterogeneous teams produced higher quality ideas in a brainstorming task than did more homogenous teams, although they did not necessarily produce more ideas or a greater number of unique ideas.

As for perceptions of teaming consideration, Baugh & Graen (1997) found that slight differences in gender and racial composition led members to rate their teams as less effective than all-male or all-White teams. In addition, much of the research on ethnic diversity has examined the experiences of those who are dissimilar from the majority. These particular studies indicate that ethnic minorities are less committed and satisfied and intend to withdraw more frequently (Greenhaus et al., 1990; Tsui et al., 1992, 1995).

Gender

Milliken & Martins (1996) examined the research between 1989 and 1994 and could find no research on the relationship between gender diversity and group cognitive functioning such as innovation. The only study they unearthed, outside the time period for their review, was Hoffman and Maier's (1961) article showing that gender diversity promoted innovation in teams. More recently, Rogelberg and Rumery (1996) found that the number of males on a team was positively related to decision quality. They also found that teams with a lone female outperformed all-male teams, suggesting that gender diversity adds to quality.

The gender dimension in teams appears to have been studied more from the perspective of psychological commitment and satisfaction of members than from a group performance standpoint

(e.g., Baugh & Graen, 1997). For example, Tsui et al. (1992) looked at age, ethnicity, gender, tenure, and education as variables relevant to individual psychological commitment, absenteeism, and intent to stay, and Konrad, Winter, and Gutek (1992) examined gender's relationship to individual perceptions of sexism, isolation, and dissatisfaction. The published studies on this topic suggest that increases in gender diversity in teams will result in negative evaluation of the teaming process and lower levels of psychological attachment.

Age

Although the research relating age to innovation is limited, it provides some corroboration with the previous research on race and gender. For example, Bantel and Jackson (1989) looked at the relationship of diversity in age, company tenure, function, and education and technical and administrative innovation. Using a sample of 199 top management teams, they found that diversity in age and function of the top management team added to administrative innovation, but they found no other relationships. This sample, however, poses some challenges for broader analysis. Because top management teams are still predominantly White and male, the number of diversity dimensions inherent in such a sample is often smaller than in groups at other organizational levels. Other research on the effects of age-related diversity on cognitive outcomes (i.e., innovation) suggests that there are few, if any, significant effects of age heterogeneity (Wiersema & Bantel, 1992; Zenger & Lawrence, 1989).

The research that compared age diversity to group outcomes focused most on the outcome of turnover rates, on which age heterogeneity consistently had a positive effect (cf. Tsui et al., 1995). As heterogeneity in age increases, the level of satisfaction decreases, leading to higher turnover. Age diversity may also have a negative impact on the team members' perceptions of their opportunity to contribute ideas. For example, Zenger and Lawrence's (1989) study examined whether frequency of technical communica-

tion enhanced group performance. They tested the relationship of age and tenure heterogeneity to technical communication frequency, using a sample of 19 project teams from a single electronics firm. Heterogeneity among group members with respect to age and tenure had a significant negative impact on technical communication frequency. They also found, in contrast, that age homogeneity was more enhancing to frequency of technical communication within the team.

Function

Of all the diversity dimensions examined in this study, the dimension of function was difficult to generalize from a non-field-study-oriented sample. Functional diversity does not lend itself to laboratory conditions. Therefore, data on the effects of functional diversity were more difficult to acquire, particularly in the area of perceptions of the teaming process. Most of the limited research on functional diversity has focused on its effects at the senior management team level (Bantel & Jackson, 1989; Wiersema & Bantel, 1992). For example, Murray (1989) found a positive relationship between functional heterogeneity and overall-company financial performance. In a meta-analysis of innovation, Damanpour (1991) found evidence that diversity of functional knowledge contributes positively to innovation.

SUMMARY AND HYPOTHESES

In summary, diversity appears to promote innovation in teams through cognitive conflict (i.e., knowledge, skills, experience, values, beliefs, attitudes, and perceptions) although team members view the team's functionality as problematic (Triandis, Hall, & Ewen, 1965). Considering the model presented by Williams and O'Reilly (1998) and related research on this topic, we present the following hypotheses:

Hypothesis 1: The degree of diversity on teams will be positively related to the quality of innovative ideas generated.

Hypothesis 2: The degree of diversity on teams will be positively related to the quantity of innovative ideas generated.
Hypothesis 3: The degree of diversity on teams will be negatively related to each team member's perceptions of teaming consideration.

Extensive laboratory research provides solid empirical support for these hypotheses. However, the generalizability of these findings to organizations is tenuous. These hypotheses, therefore, need to be examined in a field setting.

METHODS

RESEARCH SETTING

The data for this research were collected during four team-oriented technical contests administered in a division of a high-tech, Fortune 500 company over a period of 8 months. This company is known in its market for delivering first-of-a-kind products to a highly educated customer base.

SAMPLE

The sample consisted of 50 authentic, problem-solving teams composed of four to seven members each (average team size was 6.22 with a standard deviation of .91). The demographics of the participants represented that of the organization. The participants' ages ranged from 20 to 70 years (average age was in the 30s). Race was represented as Black, White, Hispanic, and Asian (5%, 85%, 3%, and 7%, respectively). There were 153 (82%) males and 34 (18%) females. Functionally, the participants were from the marketing, manufacturing, design, finance, information systems, quality, human resources, new technology, and research functions (4%, 9%, 50%, 5%, 3%, 12%, 3%, 7%, and 7%, respectively) of the organization.

PROCEDURES

Participants in the study were volunteers from within the company who participated in a technical contest for which the goal was to generate solutions to a current business problem. Prizes, albeit insignificant, were awarded to teams with the highest average scores for ideas and with the most ideas generated. Participation was voluntary, and participants were recruited through various means of publicizing each scheduled event throughout the organization.

This study spanned four contests that addressed four different problems of equal difficulty for which teams submitted ideas. Each contest was standardized in that it included a real business problem related to an unmet, technically related product opportunity. The specific task design was discretionary. That is, each team was free to combine its efforts in any manner the members chose. Each contest was held for a 3-hour duration, during the workday, every other month—thus four contests over an 8-month period. Participants were allowed to participate in all four contests if they wished, but the teams were not allowed to stay intact. The result was that 76 people (41% of total participants) participated on an average of 2.37 teams, and 111 participants participated on one team in one contest. Because the problem differed across events, no one person worked on the same problem twice.

The problem presentation lasted for approximately 1 hour, leaving the remaining 2 hours for teams to generate ideas. No participants were informed of the problem presentation topic before the actual event. So that no one learning style prevailed, lending advantage to any of the teams, the standardized presentation was delivered through a variety of mediums such as videos; written problem definitions; speakers from marketing, engineering, and finance who gave multiple perspectives on the business need; and hands-on product demonstrations. A single folder of each team's ideas was submitted at the end of the event and was judged as a product of the team, not as that of an individual. At the end of the fourth contest, a short survey, which addressed perceptions of teaming consideration, was administered.

Following the contest, a panel of expert judges evaluated the idea folders submitted by the teams. The membership of the panel of judges was the same across all four contests. The judges verified the number of ideas and judged the quality of ideas. For this study, each team had four quantified scores representing the amount of diversity for each dimension of race, age, sex, and function.

MEASURES

Quantity and Quality of Ideas

At the end of each event, each team submitted a folder containing all team ideas. The quantity of ideas score for each team was simply the count of ideas in the submitted folder. A more complex process was used to determine the quality of ideas score. A contest committee composed of a contest administrator, a patent attorney, a member of senior management, and three technical experts was established at the onset of the events. The membership of the committee was consistent across all four contests. The contest administrator, patent attorney, and senior management representatives were not selected; rather they directly worked with the particular division of the company being studied. The researchers chose the three technical experts because they had the most experience with the product development process and were expected to be available for all four contests. It was established that proper scoring for ideas was on a scale from 0 to 9 points, as follows. Simple ideas that lacked proper description or applicability, such as an idea that demonstrated no business potential, were awarded 0 points. Well-described ideas that clearly solved the stated problem technically but may have had constraints, such as cost, or may have had limited depth, aside from technical merit, were awarded 3 points. Exciting, novel ideas that were well described, had immediate applicability to the stated problem, and had clear business potential were awarded 9 points. The final score for the team was determined by the average total points awarded after each reviewer scored each team's folder individually.

Perception of Teaming Consideration

A survey was administered to participants in the fourth contest (11 teams composed of 65 people) to determine the impact of team diversity on individual perceptions of team consideration. The survey was administered at the end of the 3-hour session, before knowledge of the winner was made available. Completing the survey was voluntary but encouraged. Drawing from three studies (McLeod et al., 1996; Rogelberg & Rumery, 1996; Siegel & Kaemmerer, 1978), we developed a scale to assess perceptions of teaming consideration. The survey used a 5-point scale (*strongly disagree* to *strongly agree*) and included the following three statements: (a) On my contest team, all members' ideas were considered and valued equally; (b) On my contest team, we had an innovative process of working together; and (c) I had input to our team's strategy. Responses to the statements were averaged to develop the measure for teaming consideration. The reliability coefficient for this measure was .83.

Measuring Team Diversity

This study used the same formula to measure demographic homogeneity for each diversity dimension. The main reasons for using the same formula are consistency of meaning and the ability to rank and compare the results of the different dimensions. Both Taagepera and Ray (1977) and Teachman (1980) recommend an entropy-based formula to measure the group diversity index when data are categorical. Ancona and Caldwell (1992) also used this formula to measure teams' functional diversity. Teachman defines the formula as follows:

$$H = -\sum_{i-1}^{S} P_i \ (\ln P_i),$$

where H is quantitative heterogeneity measure of the system, P_i is probability of finding the system in state i, S is number of categories of a dimension on a team, and ln is natural log.

The formula uses the categorical representations' fractional share of total categories represented for each system to index the heterogeneity in the system. For example, we computed functional diversity for a team of seven members with two marketing, one human resources, one finance, two design, and one manufacturing members. There are five functions represented on this team, to varying degrees. Specifically, diversity would be calculated as follows:

Marketing	$H = -(2/7) \diamond \ln(2/7)$	=	.36
Human resources	$H = -(1/7) \diamond \ln(1/7)$	=	.27
Finance	$H = -(1/7) \diamond \ln(1/7)$	=	.27
Design	$H = -(2/7) \diamond \ln(2/7)$	=	.36
Manufacturing	$H = -(1/7) \diamond \ln(1/7)$	=	.27
Team functional heterogeneity score			1.53

As was stated, this formula best measures categorical data. Categorical nature was inherent in all the dimensions except age. To provide consistency in using the same formula, the age data were configured categorically into six decades (i.e., 20s, 30s, 40s, 50s, 60s, and 70s). A calculation was run for each of the 50 teams, for each of the four diversity dimensions.

DESIGN AND ANALYSIS

The independent variables in the study were the four types of diversity (race, sex, age, and function). Because team size varied, it was evaluated in the event that it needed to be statistically controlled. The dependent measures were quality of ideas, quantity of ideas, and perceptions of teaming consideration. General linear modeling was used to analyze the data and test the hypotheses.

RESULTS

The means, standard deviations, and intercorrelations are provided in Table 1. As for innovation, the results suggest that as

TABLE 1: Means, Standard Deviations, and Intercorrelations

Variable	*Mean*	SD	*1*	*2*	*3*	*4*	*5*	*6*	*7*
Predictor									
1. Racial diversity	0.30	0.28							
2. Gender diversity	0.38	0.27	.28*						
3. Age diversity	0.61	0.34	–.13	–.09					
4. Functional diversity	0.68	0.45	.18	.43**	.20				
5. Team size	6.22	0.91	–.08	.20	–.10	.01			
Outcome									
6. Quantity of ideas	14.38	11.31	.26*	–.23	–.02	.06	.08		
7. Quality of ideas	0.93	0.45	–.14	–.14	.11	.12	–.14	–.34**	
8. Teaming consideration	4.15	0.97	–.30*	–.33*	–.19	.21	.11	na	na

* $p < .05$. ** $p < .01$.

quantity of ideas generated increases, the quality of ideas generated decreases (–.34, $p < .05$).

Quality and Quantity of Innovation

The results revealed no significant relationships for quality of ideas generated, $F(5, 45) = 1.89$, $p > .10$. Thus, Hypothesis 1 was not supported.

Hypothesis 2 predicts that as diversity increases, the quantity of innovative ideas increases (see Table 2). This hypothesis received contradictory support, $F(5, 45) = 2.51$, $p < .05$. The greater the sex diversity on the teams, the lower the quantity of ideas generated, $p < .01$, $B = –18.32$, $\text{eta}^2 = .15$. This finding directly contradicts Hypothesis 2. However, as racial diversity on the teams increased, the quantity of ideas increased, $p < .05$, $B = 13.57$, $\text{eta}^2 = .12$. This finding provides direct support for Hypothesis 2.

Figure 1 provides a visual representation of the slope for the two significant relationships found for the quantity of ideas generated. This was graphed using two standard deviations below and above the mean to represent low and high diversity, respectively. It shows that as sex diversity increases, the number of ideas generated decreases. It also shows that as racial diversity increases, so does the number of ideas generated.

TABLE 2: Results of General Linear Modeling: Quantity of Ideas Generated

Variable	B	SE	*beta*	eta^2	t
Racial diversity	13.57	5.59	.36	.12	2.43*
Gender diversity	–18.32	6.50	–.45	.15	–2.82**
Age diversity	–.47	4.71	–.03	>.001	–.10
Functional diversity	4.23	3.87	.20	.03	1.09
Team size	2.46	1.84	.19	.04	1.34
Constant	–.32	11.49		>.001	–.03
df	5, 45				
F	2.51*				
R^2	.22				
Adjusted R^2	.13				

* $p < .05$. ** $p < .01$.

Perceptions of Teaming Consideration

Administration of the survey assessing perceptions of teaming consideration resulted in an 83% response rate (49 respondents). Hypothesis 3 received partial support (see Table 1). As race (–.30, $p < .05$) and sex (–.33, $p < .05$) diversity increased on teams, the team members' perceptions of teaming consideration decreased. The remaining two diversity dimensions (age and function) were not significant.

DISCUSSION

This study makes five contributions to the literature. First, this is one of the first team studies to examine these four diversity dimensions together. Second, many studies on teams have small sample sizes in terms of the number of teams in the study, whereas this study has a sample consisting of 50 teams. Third, this study was conducted in a field setting within the context of a company's program for enhancing innovation. Considering the current body of knowledge on this topic, more research on team innovation and diversity in the field is needed. Fourth, the methodology for measuring diversity is demonstrated in a way that can be used in other research. We feel this is a contribution as it was difficult for us to

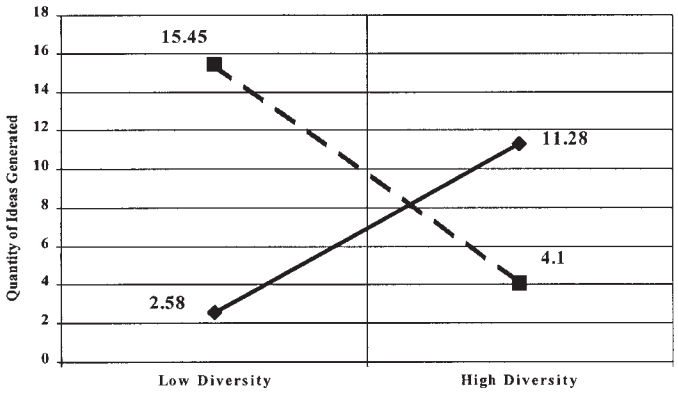

Figure 1: The Effects of Race and Gender Diversity on the Quantity of Ideas Generated

find a practical example in the literature. Finally, the findings in this study support Williams and O'Reilly's (1998) model addressing the double-edged sword of diversity. However, the findings also encourage a more contingent approach to studying and managing diversity in teams (e.g., Jackson & Ruderman, 1996). These and other issues are discussed next.

HYPOTHESES

Quality of Innovation

The nonsignificant finding for the relationship between all diversity dimensions and quality of innovation was surprising (no support for Hypothesis 1). An explanation for the findings in this study may be that newly formed teams lack the necessary time to appreciate and leverage diversity (e.g., Watson et al., 1993). The short time period for the contest may have neutralized main effects that diversity could have had. We concur with Lefkowitz's (1994) opinion that null findings in diversity research provide important information, given the prevalence of certain stereotypes. When

robust differences are found, they become even more interesting to explore.

Quantity of Innovation

Although diversity had no impact on the quality of innovation, it had an interesting impact on the quantity of innovation (providing partial and contradictory support for Hypothesis 2). Specifically, the results suggest that as a team becomes more sex diverse, the quantity of ideas will decrease. Yet, it was shown that as racial diversity increased, the quantity of ideas increased. It is also interesting to note that the more visible the demographic characteristic, the larger the effect is than less visible characteristics like age and function.

After reviewing 40 years' worth of literature and 80 studies on diversity, Williams and O'Reilly (1998) described three major unanswered questions. The first of the three major unanswered questions leads to their statement that "we need to understand in more detail how different types of diversity affect group process and performance" (p. 117). Whereas there is evidence that diversity can be studied similarly, this study supports the conclusion that each type of diversity may include unique patterns of psychological diversity (Jackson & Ruderman, 1996). That is, semantic diversity or cognitive diversity may be more germane to the issue of team innovation. Therefore, we cannot hypothesize the same relationship across all forms of diversity. Diversity requires a more contingent theoretical and empirical development. The connection and relationship of these alternative views of diversity need to be addressed in future research. The challenge is to conduct research that extends the findings of this study and helps to explain the unique characteristics of diversity.

We therefore offer some speculations based on our observations during the events. It appeared from our observations that the women were contemplative and discussion oriented. This contemplation and discussion orientation appeared to result in fewer ideas being proffered by the team members. In contrast, we noticed that the more racially diverse teams operated in a traditional brain-

storming nature. Traditional brainstorming is characterized by more ideas' being offered without as much contemplation and discussion. Future research should use behavioral observation and other techniques (e.g., qualitative methods) to examine the unique characteristics of demographic diversity within the context of teams striving to be innovative.

Perceptions of Teaming Consideration

The perception of teaming consideration measure averaged 4.15, which is a borderline score in the *strongly agree* range. The significant negative relationship that race and sex had with perceptions of teaming consideration suggests that as a team becomes more diverse, the team members will view the teaming process as less considerate of ideas, having less evaluation in its process, and less input oriented (supporting Hypothesis 3). It may be that group heterogeneity has a negative impact on individual feelings of satisfaction through decreasing the sense of identification or social integration within the group (e.g., Ancona & Caldwell, 1992; Milliken & Martins, 1996; O'Reilly, Caldwell, & Barnett, 1989; Smith et al., 1994). That is, diversity leads to negative evaluations of the teaming process (e.g., Baugh & Graen, 1997; Greenhaus et al., 1990; Jackson et al., 1991; McLeod et al., 1996; Tsui et al., 1992, 1995; Zenger & Lawrence, 1989).

LIMITATIONS

In field studies, there tend to be constraints mandated by the organization and the realities of the work environment. This was the case here as we must address four limitations. First, the data were collected from newly formed teams. This newness could, by itself, be the reason for the nonsignificant and significant results. Although this research design is applicable to teams developing innovative solutions, it cannot be as easily generalized to teams implementing ideas (Williams & O'Reilly, 1998). Second, some of the participants could sign up for more than one contest. Because of the team engagement rules, the team composites required unique

team membership structures; if people wanted to participate in a second contest, the teams could not stay together. The third limitation concerns the possibility that the time between events caused contamination by participants sharing information with each other in their daily work. To deal with this limitation, each contest had a unique problem of the same difficulty level. Finally, we did not examine team cohesion in this study. Future research should address the role of cohesion as a possible moderator or mediator in this relationship (e.g., Milliken & Martins, 1996). This is an interesting question, when considered within the context of team diversity and innovation.

PRACTICAL IMPLICATIONS

What do these results mean with regard to a diverse portfolio of people operating within any group or organization, if innovation is the desired result? Given the demographic trends, diversity will be a reality for most organizations competing for talent, not a strategic choice. Increasing diversity will be the reality; managing diversity will be the strategic choice. If diversity is ignored or mishandled, it may detract from innovation and other important work outcomes (Adler, 1986; Cox, 1994). Companies that want to excel may have to adopt innovation as a strategy and adapt their diverse organization to realize this strategy.

The results also suggest that different forms of diversity cannot be managed in the same manner. Hence, a contingency approach to managing diversity is warranted (Rodriguez, 1998). That is, organizations will need to develop policy and programs allowing for and valuing the unique characteristics among diverse groups. Although we cannot offer specific recommendations based on our findings, we can encourage practitioners to be open minded to new and creative methods for managing diversity.

The findings also support the notion that an increase in diversity on a team can decrease the team members' perceptions of teaming consideration. Cox (1994) presents compelling evidence that diverse teams with proper education and development will experience higher levels of satisfaction and lower turnover. The costs

associated with decreases in turnover can be significant when considering that minorities are as much as 40% more likely to turn over. Consider this rate of turnover in the context of a conservatively estimated $15,000 expense per person lost. Therefore, higher levels of diversity can be a positive organizational attribute when proactively addressed early in the teaming process.

CONCLUDING REMARKS

It is our hope that this article will stimulate more research and discussion on diversity in teams. Today's demographic trends reveal an ever-increasing heterogeneous pool of talent, leading organizations to experience diversity at a tremendous rate, particularly within the context of teams. Rather than examining these issues in controlled settings, researchers should continue to find creative ways to study organizations in action. Studying diversity, however, requires simplification of unmanageable complexities. This is an interesting challenge and a tremendous opportunity for researchers; there are still many unanswered questions.

REFERENCES

Adler, N. (1986). *International dimensions of organizational behavior.* Boston: Kent.

Ancona, D. G., & Caldwell, D. F. (1992). Demography and design: Predictors of new product team performance. *Organization Science, 5,* 321-341.

Bantel, K. A., & Jackson, S. E. (1989). Top management and innovation in banking: Does the composition of the top team make a difference? *Strategic Management Journal, 10,* 107-124.

Baugh, S. G., & Graen, G. B. (1997). Effects of team gender and racial composition on perceptions of performance in cross-functional teams. *Group & Organization Management, 22,* 366-383.

Cox, T. (1994). *Cultural diversity in organizations: Theory, research and practice*. San Francisco: Berrett-Koehler.

Damanpour, F. (1991). Organizational innovation: A meta-analysis of effects of determinants and moderators. *Academy of Management Journal, 34,* 555-590.

Dougherty, D., & Hardy, C. (1996). Sustained product innovation in large, mature organizations: Overcoming innovation-to-organization problems. *Academy of Management Journal, 39,* 1123-1153.

Greenhaus, H. H., Parasuraman, S., & Wormley, W. M. (1990). Effects of race on organizational experiences, job performance evaluations, and career outcomes. *Academy of Management Journal*, *33*, 64-86.

Hoffman, L. R., & Maier, N.R.F. (1961). Quality and acceptance of problem solutions by members of homogeneous and heterogeneous groups. *Journal of Abnormal and Social Psychology*, *62*, 401-407.

Jackson, S. E., Brett, J. F., Sessa, V. I., Cooper, D. M., Julin, J. A., & Peyronnin, K. (1991). Some differences make a difference: Individual dissimilarity and group heterogeneity as correlates of recruitment, promotions, and turnover. *Journal of Applied Psychology*, *76*, 675-689.

Jackson, S. E., & Ruderman, M. N. (1996). *Diversity in work teams: Research paradigms for a changing workplace*. Washington, DC: American Psychological Association.

Judy, R. W., & D'Amico, C. (1997). *Workforce 2020*. Indianapolis, IN: Hudson Institute.

Konrad, A. M., Winter, S., & Gutek, B. A. (1992). Diversity in work group sex composition: Implications for majority and minority members. In I. P. Tolbert & S. B. Bacharach (Eds.), *Research in the sociology of organizations* (Vol. 10, pp. 115-140). Greenwich, CT: JAI.

Lefkowitz, J. (1994). Sex-related differences in job attitudes and dispositional variables: Now you see them, ... *Academy of Management Journal*, *37*, 323-349.

Maier, N. R. F. (1970). *Problem solving and creativity: In individuals and groups*. Monterey, CA: Brooks/Cole.

McLeod, P. L., Lobel, S. A., & Cox, T.H.J. (1996). Racioethnic diversity and creativity in small groups. *Small Group Research*, *27*, 248-264.

Milliken, F. J., & Martins, L. L. (1996). Searching for common threads: Understanding the multiple effects of diversity in organizational groups. *Academy of Management Review*, *21*, 402-433.

Murray, A. I. (1989). Top management heterogeneity and firm performance. *Strategic Management Journal*, *10*, 125-142.

Nohria, N., & Gulati, R. (1996). Is slack good or bad for innovation? *Academy of Management Journal*, *39*, 1245-1264.

O'Reilly, C. A., III, Caldwell, D. F., & Barnett, W. P. (1989). Work group demography, social integration and turnover. *Administrative Science Quarterly*, *34*, 21-37.

Rodriguez, R. A. (1998). Challenging demographic reductionism: A pilot study investigating diversity in group composition. *Small Group Research*, *29*, 744-759.

Rogelberg, S. G., & Rumery, S. M. (1996). Gender diversity, team decision quality, time on task, and interpersonal cohesion. *Small Group Research*, *27*, 79-90.

Siegel, S., & Kaemmerer, W. (1978). Measuring the perceived support for innovation in organizations. *Journal of Applied Psychology*, *63*, 553-562.

Smith, K. G., Smith, K. A., Olian, J. D., Sims, H. P., O'Bannon, D. P., & Scully, J. A. (1994). Top management team demography and process: The role of social integration and communication. *Administrative Science Quarterly*, *38*, 412-438.

Taagepera, R., & Ray, J. L. (1977). A generalized index of concentration. *Sociological Methods and Research*, *5*, 367-374.

Teachman, J. D. (1980). Analysis of population diversity. *Sociological Methods and Research*, *8*, 341-362.

Triandis, H., Hall, E., & Ewen, R. (1965). Member heterogeneity and dyadic creativity. *Human Relations*, *18*, 33-55.

Tsui, A. S., Egan, T. D., & O'Reilly, C. A., III. (1992). Being different: Relational demography and organizational attachment. *Administrative Science Quarterly, 37*, 549-579.

Tsui, A. S., Egan, T. D., & Xin, K. R. (1995). Diversity in organizations: Lessons from demography research. In M. M. Chemers, S. Oskamp, & M. A. Costanzo (Eds.), *Diversity in organizations: New perspectives for a changing workplace* (pp. 191-219). Thousand Oaks, CA: Sage.

Tziner, A., & Eden, D. (1985). Effects of crew composition on crew performance: Does the whole equal the sum of its parts? *Journal of Applied Psychology, 70*, 85-93.

Watson, W. E., Kumar, K., & Michaelson, L. K. (1993). Cultural diversity's impact on interaction process and performance: Comparing homogenous and diverse task groups. *Academy of Management Journal, 36*, 590-602.

Wiersema, M. F., & Bantel, K. A. (1992). Top management team demography and corporate strategic change. *Academy of Management Journal, 35*, 91-121.

Williams, K. Y., & O'Reilly, C. A. (1998). Demography and diversity in organizations. In B. M. Staw & L. L. Cummings (Eds.), *Research in organizational behavior* (pp. 77-140). Greenwich, CT: JAI.

Zenger, T. R., & Lawrence, B. S. (1989). Organization demography: The differential effects of age and tenure distributions on technical communication. *Academy of Management Journal, 32*, 353-376.

Steven H. Cady is assistant professor of management and serves on the graduate faculty for the master in organization development & change program at Bowling Green State University. His research has focused on motivation and performance, along with organization development and change management.

Joanie Valentine received her master's degree in organization development & change from Bowling Green State University. She specializes is diversity research, training, and consulting through Kaleidoscope Solutions, Inc.